Fig 1

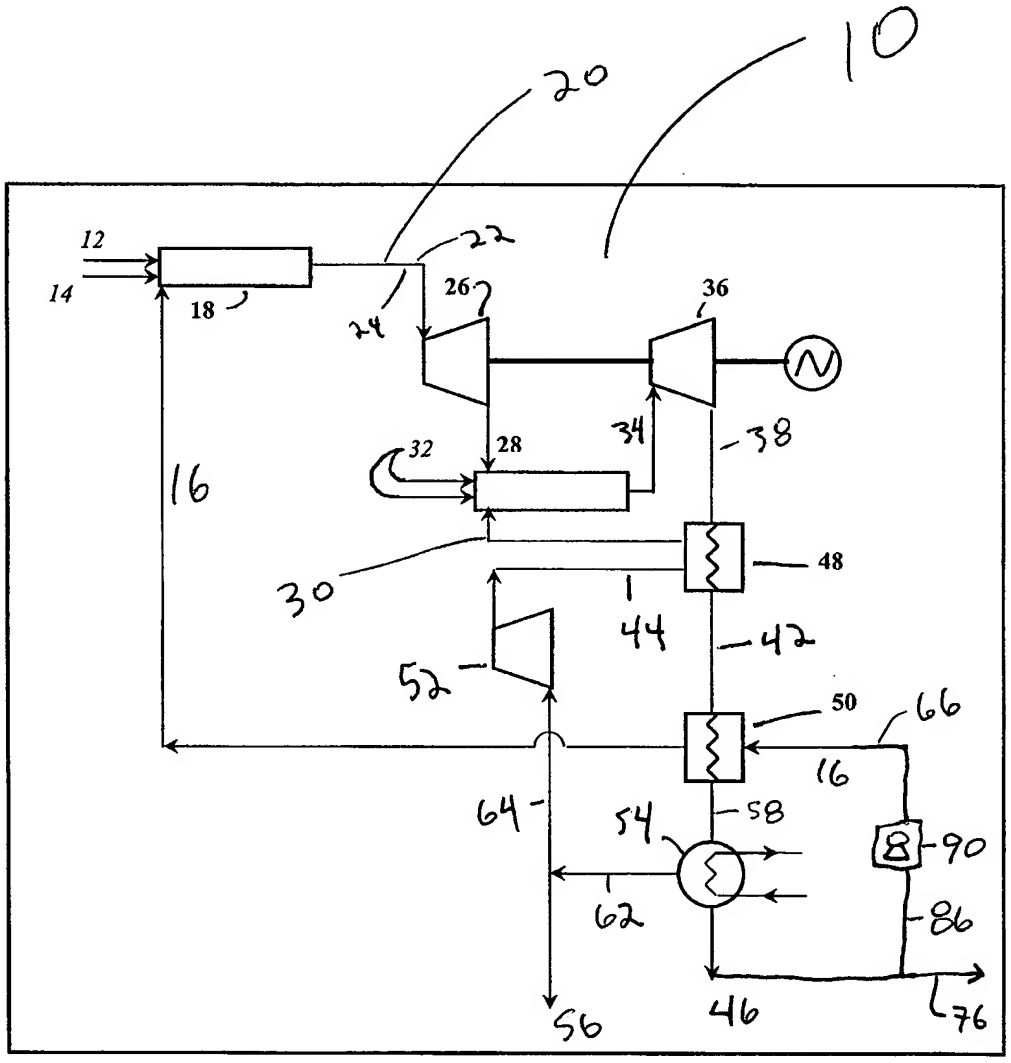
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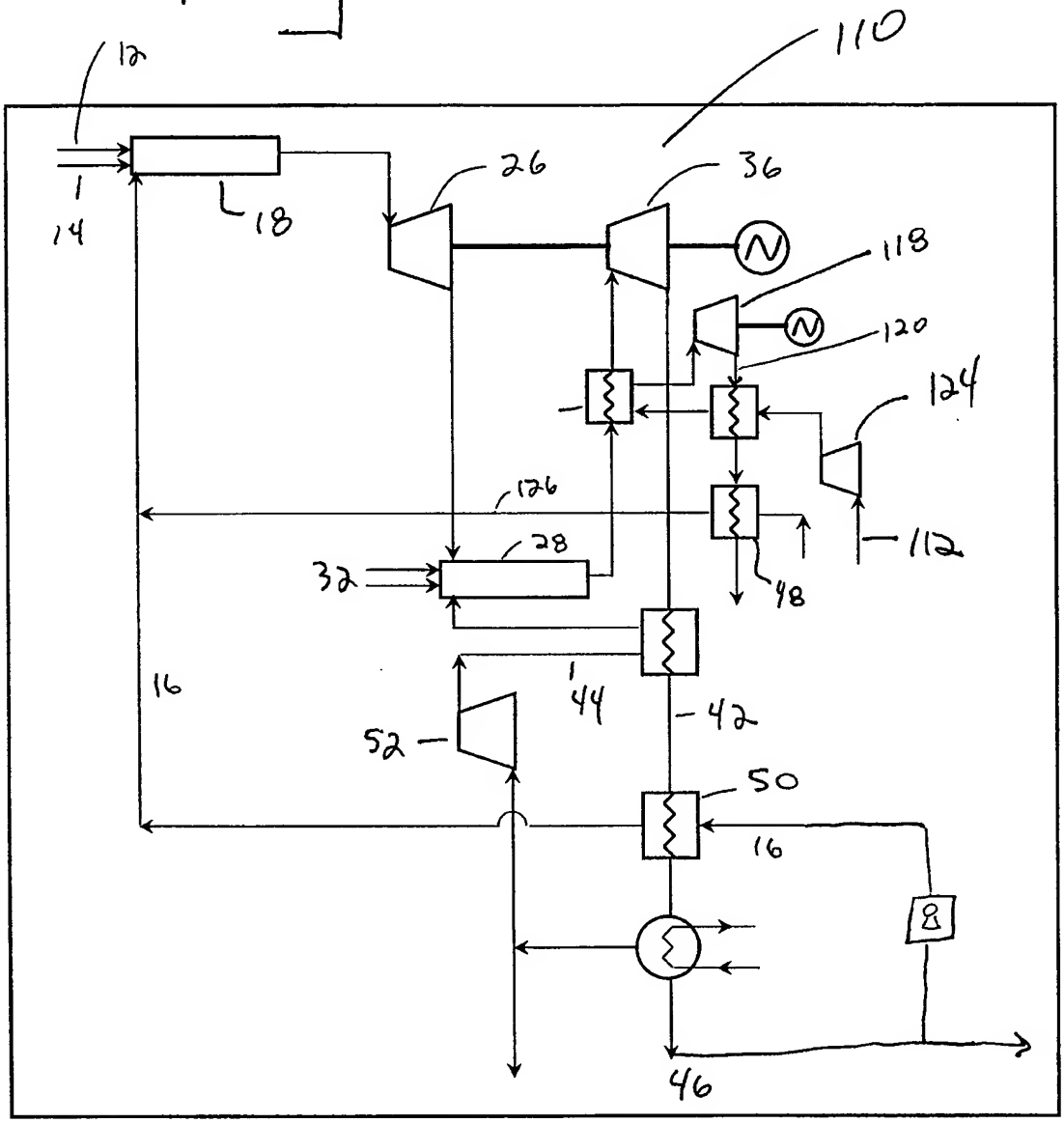
Fig. 2



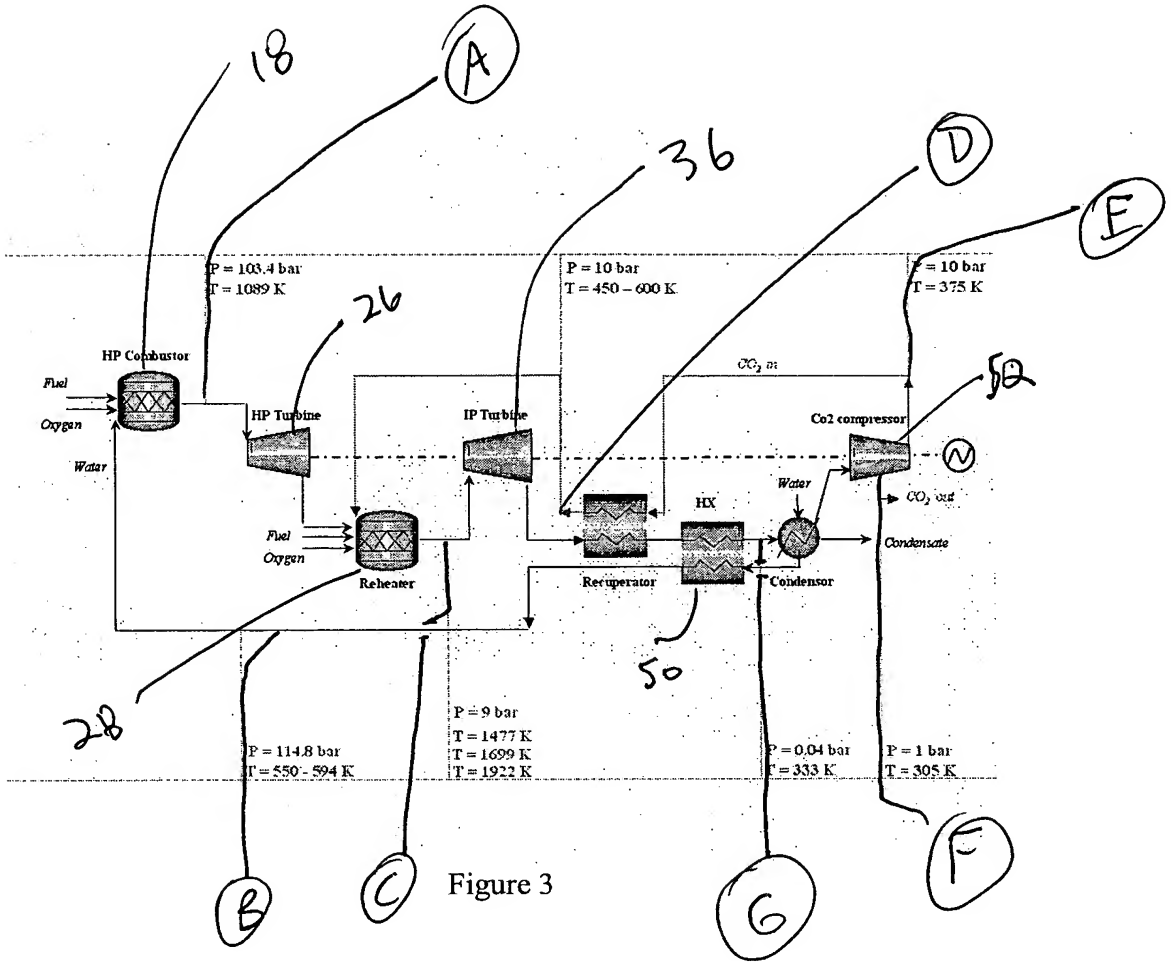


Figure 3

Fig 3

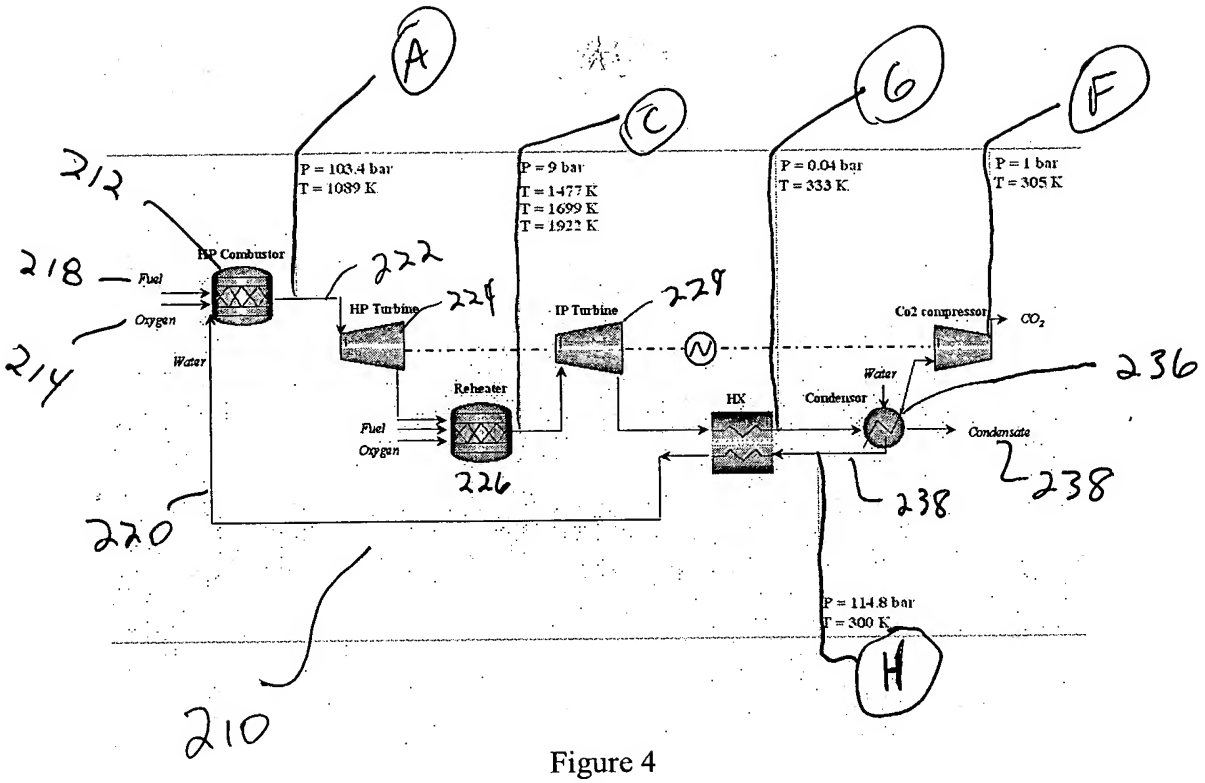


Figure 4

Fig 4

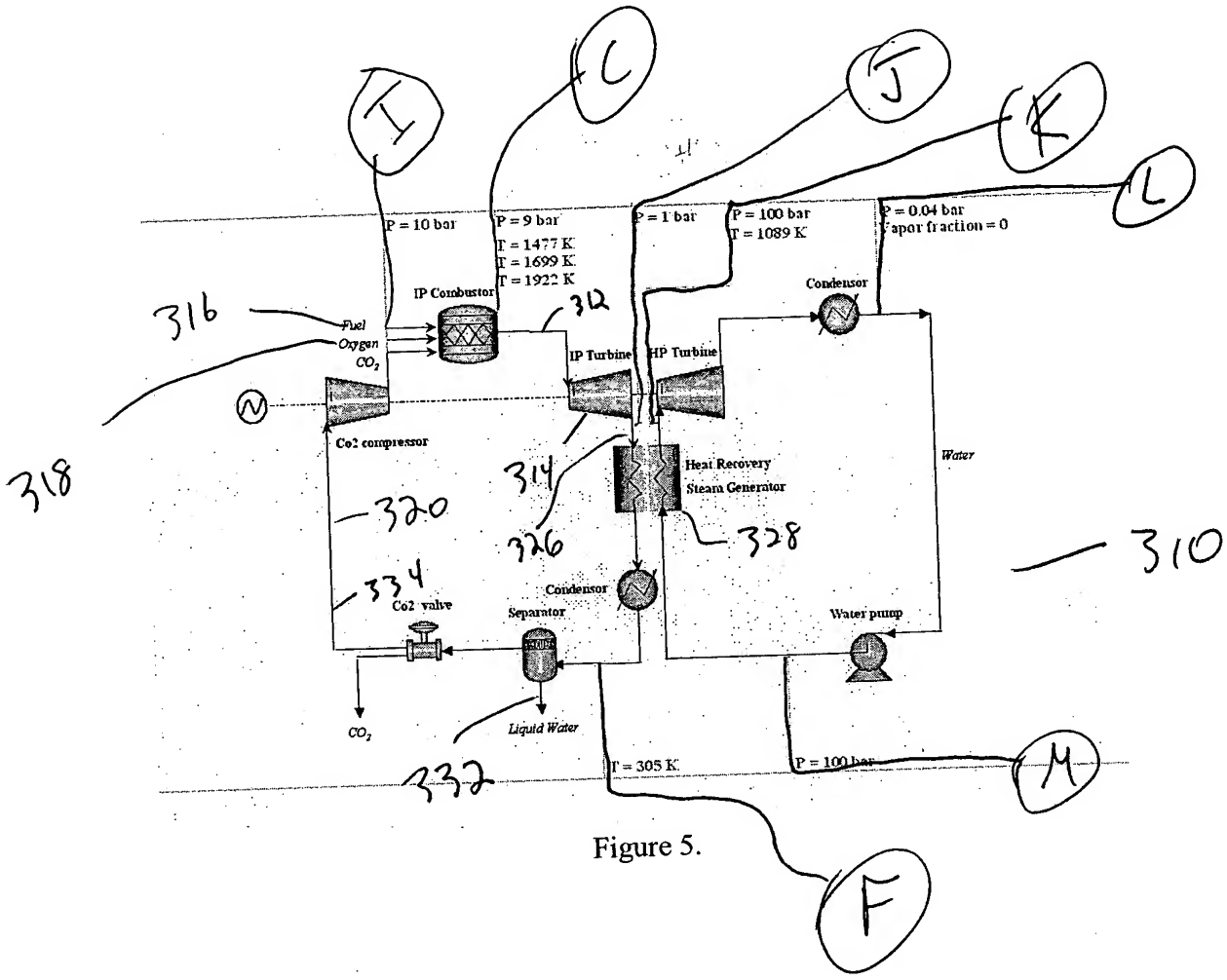


Figure 5.

Fig 5

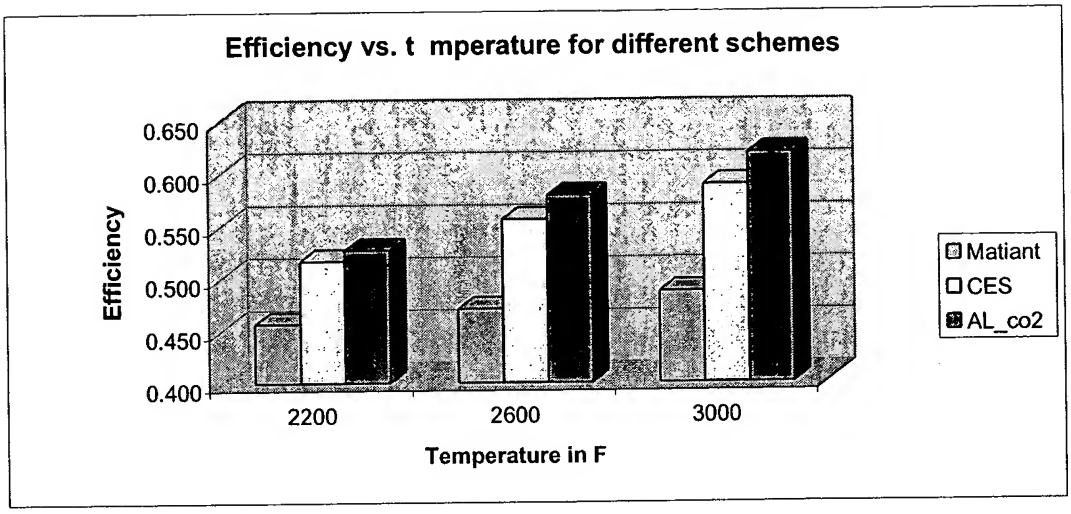


Figure 6

Fig 6

TABLE 7 -- Water Recycle

Fuel	CH4
Temperature Inlet	293 K
Pressure inlet	12.41 bar
Oxidant	O2
Temperature inlet	293 K
Pressure inlet	27.58 bar
Fuel 2	CH4
Temperature Inlet	293 K
Pressure inlet	10 bar
Oxidant 2	O2
Temperature inlet	293 K
Pressure inlet	10 bar
o2 &ch4 (HP) (IP) Mcompressors	
number of stage	4
method	polytropic
discharge pressure	(114.8) (10) bar
isentropic efficiency	0.8
intercooling	90 F each stg expt last
Pressure drop	0 psi

HP c mbustor	
Pressure outlet	103.4 bar
pressure drop	10%
reaction	complete
Q loss	0=adiabatic
Turb1=Steam turbine HP	
method	isentropic
discharge pressure	10 bar
isentropic efficiency	0.9
Inlet temperature	1089 K
Reheater IP	
Pressure outlet	9 bar
pressure drop	10%
reaction	complete
Q loss	0=adiabatic
Turb2=Gas turbine IP	
method	isentropic
discharge pressure	0.04 bar
isentropic efficiency	0.93
Inlet temperature	2200 2600 3000 F

TABLE 8 -- CO_2 Recycle

Gas turbin side

Fuel	CH4
Temperature Inlet	293 K
Pressure inlet	10 bar
Oxidant	O2
Temperature inlet	293 K
Pressure inlet	10 bar
IP combustor	
Pressure outlet	9 bar
pressure drop	10%
reaction	complete
Q loss	0 W adiabatic
Gas turbine	
method	isentropic
discharge pressure	1 bar
efficiency	0.93
Inlet temperature	2200 2600 3000 F
HRSG	
hot stream outlet	140 F
Pressure drop	not taken into account
Condensor 1	
hot stream outlet	100 F
Pressure drop	not taken into account
(Co2) Mcompressors	
number of stage	4
method	polytropic
discharge pressure	10 bar
efficiency	0.8
intercooling	90 F each stg expt last
Pressure drop	not taken into account
Water pump	
discharge pressure	2 bar
efficiency	0.75
Water	
Temperature inlet	293 K
Pressure inlet	1 bar

St am turbine sid

Steam turbin	
method	isentropic
discharge pressure	0.04 Bar
efficiency	0.9
Inlet temperature	1089 K
Condensor 2	
hot stream outlet	vap frac=0
Pressure drop	not taken into account
Separator 1	
temperature	305 K
pressure	1 bar
Liquid entrainment	0
Water pump	
discharge pressure	2 bar
efficiency	0.75
Water	
Temperature inlet	293 K
Pressure inlet	1 bar
Circulation pump	
discharge pressure	100 bar
efficiency	0.75

TABLE 9 -- Preferred Embodiment

Fuel	CH4
Temperature Inlet	293 K
Pressure inlet	12.41 bar
Oxidant	O2
Temperature inlet	293 K
Pressure inlet	27.58 bar
Fuel 2	CH4
Temperature Inlet	293 K
Pressure inlet	10 bar
Oxidant 2	O2
Temperature inlet	293 K
Pressure inlet	10 bar
o2 &ch4 (HP) (IP) Mcompressors	
number of stage	4
method	polytropic
discharge pressure	(114.8) (10) bar
isentropic efficiency	0.8
intercooling	90 F each stg expt last
Pressure drop	0 psi
CO2 Mcompressor	
number of stage	3
method	polytropic
discharge pressure	10 bar
isentropic efficiency	0.8
intercooling	90 F each stg expt last
Pressure drop	0 psi

HP combustor	
Pressure outlet	103.4 bar
pressure drop	10%
reaction	complete
Q loss	0=adiabatic
Turb1=Steam turbine HP	
method	isentropic
discharge pressure	10 bar
isentropic efficiency	0.9
Inlet temperature	1089 K
Reheater IP	
Pressure outlet	9 bar
pressure drop	10%
reaction	complete
Q loss	0=adiabatic
Turb2=Gas turbine IP	
method	isentropic
discharge pressure	0.04 bar
isentropic efficiency	0.93
Inlet temperature	2200 2600 3000 F

Vaccum 'pump' (Mcompressor)	
number of stage	4
method	polytropic
discharge pressure	1 bar
isentropic efficiency	0.8
intercooling	90 F each stage
Pressure drop	0 psi
HeatX1 = Condensor	
hot stream outlet	333 K
Pressure drop	not taken into account
HeatX B1 = recuperator	
hot stream outlet	605 K
Pressure drop	not taken into account
Air cooler	
hot stream outlet	295 K
Pressure	0.04 bar
Pressure drop	not taken into account
co2 reheater	
hot stream outlet	326.6 K
Pressure drop	not taken into account
Water pump	pump
discharge pressure	114.8 bar
efficiency	0.75
Wout pump	pump
discharge pressure	1 bar
efficiency	0.75
Water	
Temperature inlet	293 K
Pressure inlet	1 bar

TABLE 10 -- Comparison

Type of cycle	T HP	T IP	Final Pr ssur	M.F. CO2	M.F. CO2	Eff	Eff
	F	F	Bar	flue gas	recycled	Without seq	With seq
matiant	1500	2200	1 & 0.04	0.930	0.916	0.456	0.438
matiant	1500	2600	1 & 0.04	0.914	0.893	0.471	0.452
matiant	1500	3000	1 & 0.04	0.868	0.897	0.487	0.468
CES	1500	2200	0.04	0.222	0.000	0.516	0.498
CES	1500	2600	0.04	0.234	0.000	0.556	0.537
CES	1500	3000	0.04	0.246	0.000	0.588	0.570
CO2 case2	1500	2200	0.04	0.805	0.890	0.527	0.509
CO2 case2	1500	2600	0.04	0.800	0.876	0.579	0.560
CO2 case2	1500	3000	0.04	0.785	0.856	0.618	0.599